PRP RESPONSE NO.	REFERENCES	EPA COMMENT/REWRITE	PRP ISSUE/RESPONSE	EPA FOLLOW-UP RESPONSE
1	EPA Comment Item 2.a	*EPA concluded that Alternatives 7 through 10 could satisfy the criterion, "Overall Protectiveness" because either one or more MCLs would be met throughout most of the plume, if not all of it. In cases where MCLs could not be met, a Technical Impracticability waiver would likely be granted.*	See PRP Response No. 34 (page 5 in this table) to *Page ES-12, Overall Protection of Human Health and the Environment Summary* below. Meeting the MCL ARAR or obtaining a Technical Impracticability waiver should not be a requirement for meeting the "Overall Protectiveness" criterion.	In the December 3, 2014 meeting, EPA agreed to provide an additional response regarding this issue. This response is intended to cover this issue and the Respondents' other comments related to evaluation of the alternatives against the threshold criteria. Upon further review, EPA agrees that all of the proposed alternatives (except Alternative 1) would satisfy the criterion for "Overall Protectiveness". As such, all alternatives will be included in the comparative analysis. Meeting the MCL ARAR may be assessed similarly to what was presented in the DFFS, emphasizing that alternatives that treat or remove all known PTWs have significantly greater effect on plume reduction than those that leave known quantities of PTW behind. Statements regarding whether or not a TI waiver would likely be granted may be removed. EPA will require that the Respondents provide a pre-final review copy of the FS that contains Section 1 through 7 of the text prior to submittal of Section 8 (Comparative Analysis of Alternatives).
2	EPA Comment Item 2.b	*The Respondents consistently ignored acknowledging that MCLs could be met for one or more of the Indicator COCs in various locations of the groundwater plume before a 100 years passed.*	This statement is incorrect. Sections 7.9.1, 7.9.2.1, 7.11.1, 7.11.2.1, and 8.2 of the DFFS all discuss Indicator COCs that are predicted to achieve MCLs in less than 100 years. Furthermore, the reduction in area (i.e., locations where MCLs may be met) is a significant factor in the DFFS evaluation for all alternatives.	Respondents' comments are noted.
3	EPA Comment Item 2.c	***Long-term Effectiveness and Permanence.*** *The Respondents evaluation for each alternative only focused on whether source control RAOs were met or not and the mechanism for controlling contamination left in place by describing various engineering controls. There is no discussion about the potential risk of the contamination left on-site. EPA revised the discussion of this criterion in Section 7 to discuss risk by presenting quantitative measures "of the volume or concentration of contaminants in waste, media, or treatment residuals remaining on the site" in accordance with guidance.*	This statement is untrue. The DFFS provides extensive analysis of potential risk and includes consideration of not just the volume and concentration of contaminants, but also their location and risk for release or future exposure. See the detailed evaluation of each alternative (Sections 7.3.3.1, 7.4.3.1, etc.) and the comparative evaluation (Section 8.3.1) of the DFFS. The EPA's analysis treats all DNAPL as having the same residual risk. The EPA's analysis is deficient because it ignores the variability in residual risk resulting from contamination in different locations and with different mobility characteristics.	In the December 3, 2014 meeting, EPA agreed to provide an additional response regarding this issue. EPA stands on its definition of oil-wetted or oil-coated soil or sediment as PTW, which is to be addressed consistently (see PRP Response No. 41). Differing locations (e.g., depth) and mobility may influence prioritizing interim actions but a final remedy must address all PTW unless technically impracticable.
4	EPA Comment Item 3	***Biased Assessment of Remedial Technologies.*** *EPA is also disapproving Section 7 because certain aspects of the evaluation of alternatives were based on several overarching assumptions that resulted in biased evaluations.* *Respondents use the assumption that generation of residuals associated with dredging or excavation are such a disadvantage that any alternative that is removal-based cannot achieve the best balance of pros and cons to justify selection of primarily removal based alternative.*	Section 7 of the DFFS includes discussion of impacts regarding capping (Figure 7-4), describes impacts from both dredging and capping, and acknowledges that BMPs can be used to control impacts. We strongly disagree with the EPA's contention that the DFFS precludes alternatives that include source removal. Source removal, including sediment dredging, is a significant component of the remedy that Respondents proposed as having the best balance of tradeoffs (new Alternative 4a). Advances in sediment dredging technology were incorporated as described in PRP Response No. 5 to EPA Comment Item 3.a.i below. On the contrary, we believe that EPA's analysis is highly biased toward full removal/treatment alternatives without providing a technical	Respondents' comments are noted. Respondents may revise discussions regarding the effectiveness of BMPs for mitigating construction impacts and controlling residuals, which EPA will review prior to finalizing the FS.

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			basis for this apparent bias. Their analysis understates the potential impacts of the large-scale removals proposed in Alternatives 7 through 10 by assuming that BMPs will be adequate to mitigate all impacts, and overstates the ability to control residuals (see PRP Response No. 5 to EPA Comment Item 3.a.i below). We strongly disagree with the EPA's assumption regarding the potential for residuals, based on the subsurface complexities of the Site. The EPA's analysis of alternatives is predicated on the potential for Alternatives 7 through 10 to achieve MCLs in groundwater, but no technical justification or relevant case studies (i.e., dredging at coal tar/creosote sites) are provided.	
5	EPA Comment Item 3.a.i	*The Respondents reference source information that is considered dated at this point. Since that time, there have been advances in dredging technology. In fact, some recent cleanup dredge projects have achieved cleanup numbers on dredged surfaces without incorporating the use of thin sand covers over residual contaminated surfaces.*	The DFFS alternatives include consideration of advances in technology, for example the SedVac technology for dredging DNAPL-containing sediments. This technology is more recent than the mechanical environmental bucket technology the EPA has added, and more applicable and protective for the shallow DNAPL in the TD area. We requested information from Shawn Blocker on the EPA's "recent cleanup dredge projects [that] have achieved cleanup numbers on dredged surfaces without incorporating the use of thin sand covers over residual contaminated surfaces" but no information was provided. The Boeing Plant 2 and Todd Shipyard case studies are not relevant since they did not include dredging of NAPL or, more specifically, coal tar DNAPL. Section 7.5.5.3 of the DFFS states: *Based on detailed studies performed at a range of environmental dredging sites which included silt curtains or similar technologies, approximately 2 to 4 percent of the mass of hydrophobic contaminants such as cPAHs that are dredged are released into the water column, with most of the release being in the bioavailable dissolved form (Bridges et al. 2010)*. We disagree that a 2010 reference should be considered 'dated'. Also note that EPA has deleted the above statement and replaced it with: *As discussed in Appendix C, Section C5.3.2, studies have concluded that a small percentage of the solids excavated or dredged during the last dredge production cut may accumulate as a post-dredge residual layer*. It is inconsistent to replace a water column release reference with a sediment residual reference. We disagree with this revision to the text.	Respondents' comments are noted and EPA agrees to strike this comment and the revision to Section 7.5.5.3.
6	EPA Comment Item 3.a.ii	*Respondents failed to acknowledge a number of troublesome issues about the use of capping on contaminated sediments. Aside from the fact that alternatives that rely heavily on the use of aquatic caps, in perpetuity, can be eroded or damaged will require monitoring and maintenance "forever". A cap that fails because it erodes or is damaged can release contamination for a long time before it is noticed.*	Issues related to long-term monitoring and maintenance of caps were considered in the DFFS evaluation. The EPA's added statement: *A cap that fails because it erodes or is damaged can release contamination for a long time before it is noticed* is not relevant since there is no current DNAPL seepage observed in the existing (uncapped) condition. Note that the Respondent's preferred remedy includes dredging of all shallow DNAPL and capping of areas where DNAPL is deep and isolated by existing sediment.	EPA stands by the added statement. During oversight of the September 9, 2014 shoreline assessment by Grette Associates, sheens were observed in the water north of the T-dock. Bubbles of product floating to the surface were also observed as the team walked through the water. EPA will provide Respondents with photos showing the sheens.

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7	EPA Comment Item 3.a.iii	*Respondents propose the use of some recently developed technologies, amended caps and RCM caps, where there is no field data or experience regarding the long-term use and effectiveness of reactive caps. They show promise however, the many concerns about their reliability was not addressed, such as at Quendall where nearshore bathymetry must be maintained, and if a RCM cap was installed, how is it replaced or repaired without causing releases or badly damaging the habitat.*	Field data on the long-term effectiveness of RCM caps is accumulating. The EPA Region 10-approved remedy at the McCormick and Baxter site has both bulk organoclay and RCM caps spanning 23 acres that were installed in 2004. Extensive laboratory and field testing in 2006 and 2008 confirmed that both caps are performing as designed (Blischke and Olsta, 2009). These capping technologies have widespread usage, as discussed in Appendix C of the DFFS. In Section 7.5.3.2, the EPA added the statement: *Mixing reactive material with capping media is an evolving technology and is expected to be used successfully in the future*. This statement is not relevant since RCM placement without release of DNAPL has been demonstrated as described in Appendix C, and EPA Comment Item 121 indicates EPA had no comments on Appendix C. EPA's comments and text rewrites (e.g., rating implementability low for Alternative 3) expresses a bias against capping, particularly RCM caps, which is inappropriate for an FS that is intended to objectively evaluate a range of remedial options. As described above, capping has been evaluated and successfully implemented at numerous sites and should be considered a highly implementable technology.	Respondents' comments are noted. Note that during the December 3, 2014 meeting, EPA agreed that in the Final FS, amended sand caps could be included for alternatives that proposed RCM caps in the nearshore area, and that RCM caps could still be used for alternatives that proposed them for T-Dock sediment. Respondents may revise discussion of RCM caps in the context that RCM caps could still be used for alternatives that proposed them for T-Dock sediment. EPA will review revisions prior to finalizing the FS. Ratings modifications are addressed in PRP Response No. 48.
8	EPA Comment Item 3.b	*However, as noted, residuals can be a result of dredging but Respondents cannot automatically assume that residuals will cause a failure to meet cleanup numbers with today's technology and practices. Respondents fail to pay equal attention to the problems associated with alternatives that rely on ICs, in addition to capping, for remedial protectiveness and reliability. More can be done to prevent exposure to dredge residuals than to ensure the enforcement of ICs.*	The DFFS discusses limitations due to ICs. Note that the EPA's rewrite of Section 7 acknowledges that long-term monitoring and ICs in both the upland and aquatic areas will be needed in perpetuity to ensure effectiveness for Alternatives 7 through 10 (see Section 7.9.4.3). Yet the EPA's analysis is heavily biased against Alternatives 2 through 6 based on the EPA's perception of the uncertainty in enforcing and maintaining ICs, even though all ICs discussed have been commonly implemented at similar sites.	Respondents' comments are noted. EPA agrees that ICs will be necessary to some degree for all of the alternatives, but maintains that **ICs are more reliably enforceable in the uplands as compared with the aquatic environment.** The Respondents may change the language under Administrative Feasibility for Alternative 2, Section 7.3.6.2 ("However, many of the institutional controls intended to protect aquatic remedial technologies are unenforceable") to be consistent with the **bold** statement above. Ratings modifications are addressed in PRP Response No. 48.
9	EPA Comment Item 4	***EPA Disapproves Section 8 of the Draft FS.*** *EPA is disapproving Section 8 of Respondents' draft final FS, dated October 14, 2013. Section 8 of the FS is deficient. The Respondents' comparative evaluation is based on the evaluation of individual alternatives in Section 7. Unfortunately, because Section 7 is not consistent with the NCP and RI/FS guidance in the way in which many of the NCP 9 Criteria are meant to be applied, or the evaluation is incomplete, Section 8 does not contain justifiable results from the comparative analysis using the NCP's 9 Criteria.*	As discussed in other comment responses, we disagree with the EPA's contention that Section 7 of the DFFS is inconsistent with the NCP and RI/FS guidance. We also disagree with the EPA's characterization of Section 8 of the DFFS as deficient. The primary substantive change in the EPA's rewrite of Section 8 is deletion of the comparative analysis for Alternatives 2 through 6 on the basis that these alternatives would not qualify for a TI Waiver (a premature consideration at the FS-stage of the remedy selection process).	As noted in PRP Response No. 1, EPA agrees that all alternatives will be included in the comparative analysis and that the TI waiver language may be removed.
10	EPA Comment Item 6	*EPA stated several times that the Respondents should provide the same information for Alternative 4a as they provided to EPA for the other alternatives. EPA never received a complete set of information for Alternative 4a.*	Relevant information for Alternative 4a was provided in Aspect's March 14, 2014 technical memorandum re: Proposed Preferred Remedy at the Site.	Comment noted.

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11	EPA Comment Item 7	*The Habitat Area shall not contain a PRB or collection trenches or other remedial technology without the permission of EPA, the Muckleshoot Tribes and Trustees. These technologies are incompatible with the purpose of the Habitat Area and cannot be maintained or replaced without significant damage to the Habitat Area.*	As previously directed by the EPA, the DFFS assumes that PRB/trenches are not located in habitat area. However, we disagree with the EPA's statement that all remedial technologies are incompatible with the habitat area. Compatibility should be evaluated on a case-by-case basis during remedial design. Categorically excluding remedial components in the habitat area without detailed evaluation of compatibility limits the effectiveness and potential benefits of certain remedial technologies.	Comment noted.
12	EPA Comment Item 8	*EPA has determined that the Renton SMP is not an ARAR.*	We strongly disagree and have explained the basis of our objection to the EPA's ARAR determination in Respondent's letter to Lynda Priddy of the EPA regarding Dispute Resolution – Comment on Draft Final FS, dated November 6, 2014.	This issue has been addressed outside of the technical group.
13	EPA Comment Item 9	***Risk-based PRGs at 10^{-6}.*** *EPA has identified risk-based PRGs at a risk level of 10^{-6} in the Draft Final FS. The exception is naphthalene in groundwater, where a RBC of 1.4 ug/L based on a risk level of 10^{-5} is used, for reasons provided in the text.*	The EPA has not provided any basis for changing the risk level from 10^{-5} to 10^{-6} for identifying PRGs (for purposes of the DFFS)	EPA changed the risk level from 10^{-5} to 10^{-6} to be consistent with the NCP per 40 CFR 300.430(e)(2)(i), using 10^{-6} as a point of departure.
14	EPA Comment Item 10	*The Respondents cannot make claims that impermeable caps associated with future development can impact DNAPL mobility, etc., with the implication that it would aid remediation unless the Respondents want to install an impermeable cap during remedial action. Otherwise, the occurrence of an impermeable cap is speculation.*	Evaluation of DFFS alternatives assume permeable caps. However, because impermeable caps are a possible component of future development, it is important to state how such a cap would affect the remedy. Impermeable caps are expected to be compatible with the chosen remedy because, if anything, leaching would be reduced as stated in the DFFS. It is unclear why the EPA wants to remove this evaluation when it addresses a potential future change of Site conditions. Furthermore, EPA previously agreed to include impermeable caps in the groundwater model because of the likelihood that such a cap will be installed in the future.	Respondents may include a discussion in the Final FS of how impermeable caps could affect the remedy.
15	EPA Comment Item 11	*The type of thermal treatment will be determined in RD. The term "thermal desorption" was often used and not well-defined. Thermal desorption can refer to a number of different thermal treatment systems, especially when the temperature range is not specified, or whether an afterburner is coupled with the treatment system. Therefore, the term "thermal desorption" is replaced by the term "thermal treatment".*	Thermal desorption is well defined in Section 5.3.2.5. Thermal treatment is used in the DFFS as a more general term that includes vitrification and incineration. Replacing thermal desorption with thermal treatment adds confusion.	Respondents may add a footnote in the Final FS excluding vitrification from thermal treatment; otherwise the terminology change stands.
16	EPA Comment Item 12	***RCM Caps.*** *EPA has a number of concerns regarding the use of RCM caps. There is little, if any field data, on the service life of reactive materials as used in various technologies. Analytical calculations are used to "estimate" the service life or replacement rate of reactive materials. Additionally, the replacement process has not been described and the impacts associated with removing or adding additional material when needed. The obstacles to be encountered at Quendall when placing or removing RCM caps has not fully been addressed. The placement of a RCM could be compromised by the extensive amount of wood debris in or on the Quendall sediments. These issues have not been discussed sufficiently in the FS, especially in the evaluation of alternatives.*	See PRP Response No. 7 to EPA Comment Item 3.a.iii. EPA Comment Item 121 indicates that EPA had no comments on Appendix C. The issues identified in this comment related to debris or replacement could be addressed in the FS and do not provide a basis for eliminating an organoclay RCM cap. A debris survey and removal of large debris would likely be part of the sediment remedy whether dredging or capping is selected. Typically, these caps are designed with a large factor of safety that minimizes the frequency and need for replacement. More Site-specific data could be collected to support a Site-specific application. The EPA-approved West Branch of the Grand Calumet River project	Respondents' comments are noted. Respondents may revise discussion of RCM caps in Section 7.3.3.2 in the context that RCM caps could still be used for alternatives that proposed them for T-Dock sediment. EPA will review revisions prior to finalizing the FS.

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			includes a 6-inch organo-clay cap with an estimated design life of 420 years.	
17	EPA Comment Item 13	***One Process Option.*** *EPA does not see a reason to include more than one process option in a given alternative (e.g., amended sand cap and RCM cap), as that decision can be considered during remedial design. EPA eliminated the amended sand cap and used the RCM cap as the representative process option.*	In the EPA's rewrite, the EPA states that amended caps are more reliable and have fewer concerns for implementability, maintenance, and replacement than RCMs (Section 7.3.6.1). It is unclear why the EPA chose to retain the process option they perceive as less reliable. The EPA's comments and text rewrite expresses a bias against capping that is inappropriate for an FS, which is intended to objectively evaluate a range of remedial options.	As noted earlier, during the December 3, 2014 meeting, EPA agreed that in the Final FS, amended sand caps could be included for alternatives that proposed RCM caps in the nearshore area, and that RCM caps could still be used for alternatives that proposed them for T-Dock sediment. The Respondents may revise the text describing RCM caps, which EPA will review prior to finalizing the FS.
18	EPA Comment Item 14	*ENR Area. EPA changed the ENR area to be determined as twice the BTV rather than 8 times the BTV.*	What is the basis for 2X the BTV? No basis has been provided in the comments or in the revised text.	Respondents may use 8x the BTV in the Final FS and note that the actual criterion will be developed during RD. Respondents may add an appendix with the calculation supporting the 8x value.
19	EPA Comment Item 20	*Add an additional bullet (after the North and South Sump bullet): "Quendall Pond, located near the shoreline, was constructed in an area where tank bottoms from nearby storage tanks were placed. This area also received wastes from North Sump overflows. Waste from Quendall Pond has migrated into adjacent Lake Washington."*	This text revision is misleading. We are not aware of any waste (e.g. DNAPL) from Quendall Pond migrating into Lake Washington. Suggested edit to last sentence: *DNAPL from Quendall Pond has migrated into* ***sediments beneath*** *Lake Washington.*	EPA disagrees with the suggested edit. There is insufficient data to support limiting the impact of Quendall Pond waste on the sediments in the lake versus the lake in general.
20	EPA Comment Item 26	*Replace last two sentences "However, four samples…" with: "There are a few instances of very low detections of benzo(a)pyrene above the MCL in areas outside of the DNAPL "footprint", but they are either bordering on the footprint (2 µg/L in BH-12 and 2.3 µg/L at BH-18A) or are at concentrations very close to the MCL (0.24 µg/L at BH-29A and 0.23 µg/L at WP-4)."*	The new sentences should be added without the indicated deletion. Soil data are relevant to evaluating the distribution of cPAHs in groundwater in areas where the soil data provide better resolution than the available groundwater data. The soil data are important in the evaluation of the restoration time frame for benzo[a]pyrene.	EPA agrees that the new sentences can be added without the indicated deletion.
21	EPA Comment Item 45	*Delete: "Although implementation of low permeability and impervious caps are relatively more expensive then permeable caps, they may be appropriate in portions of the Site or for some future Site uses, and can be more effective than permeable caps by preventing infiltration and reducing leaching of contaminants. Permeable caps may be more cost-effective to protect against direct contact with contaminated soil in areas where leaching is not a concern."*	We disagree with this deletion. See PRP Response No. 14 to EPA Comment Item 10.	Respondents may include a discussion of how impermeable caps could affect the remedy.
22	EPA Comment Item 46	*Revise to: "In situ solidification/stabilization described in Section 5.3.1.3 for DNAPL is applicable and effective for immobilizing Site COCs in soil as it is the most common remedial technology used at creosote/coal tar Superfund Sites."*	What is the authority for the statement that *in situ* solidification/stabilization is the most common remedial technology used at creosote/coal tar Superfund Sites?	EPA will provide the Superfund annual report on remedy implementation.
23	EPA Comment Item 47	*Delete "Biodegradation is ongoing at the Site".*	We disagree with this deletion. In describing the potential effectiveness of bioremediation, it is important to note that biodegradation is an ongoing process at the Site. Bioremediation is less effective at sites where natural biodegradation does not occur.	Respondents may keep this statement if supported, for example: "As evidenced by ____, biodegradation is ongoing at the Site."
24	EPA Comment Item 57	*Revise to: "Environmental buckets vary in size and can be retrofitted to address different degrees of sediment hardness. For example, at the Todd Shipyard Sediment Operable Unit at*	See PRP Response No. 5 to EPA Comment Item 3.a.i.	EPA stands by this revision.

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		Harbor Island (Todd), large steel plates were soldered to the sides of an environmental bucket to provide more weight for penetrating sediments. Appropriately large environmental buckets can be used to handle debris. For example, at Todd large and cumbersome shipyard debris was successfully removed (see Figure 5-1)." *Create a new Figure 5-1 with the figure provided at the end of this comment chart. Caption the figure: "Environmental Dredge Bucket Used at Todd Shipyard, Harbor Island, Washington."*		
25	EPA Comment Item 58	*Revise to: "However, many of these effects are reduced due to recent innovations, increased operator expertise, use of containment (e.g., sheet piles, silt curtains, booms), best management practices (BMPs) (e.g., production rates, bucket control, etc.), and/or by equipment selection. Recent dredging events at the Boeing facility on the Duwamish River were accomplished without exceedances of sediment cleanup numbers."*	We disagree with this revision because it fails to consider the presence of DNAPL. Recent innovations have reduced the 4R's (resuspension, release, residual, and risk) related to solid-phase contaminants, but do not completely address potential effects due to dredging sediments with DNAPL. The EPA's proposed revision is not adequately considering the complexity of the DNAPL source distribution and subsurface heterogeneity at the Site.	EPA is refining its comments to change "many of these effects are reduced" to "many of these effects may be reduced", and to delete the sentence referencing the dredging on the Duwamish.
26	EPA Comment Item 60	*Revise to: "Thermal desorption of sediments may be less effective than for soils due to the higher moisture content of sediment and typically requires dewatering of sediments prior to treatment. For the purpose of the FS, the term "thermal treatment" will be used, as the specifications for the treated material and emission standards will be determined during remedial design."*	See PRP Response No. 15 to EPA Comment Item 11.	Respondents may add a footnote in the Final FS excluding vitrification from thermal treatment; otherwise the terminology change stands.
27	EPA Comment Item 80	*Use Table 8-2 as a basis and update as follows:* *1. Remove "Containment with" from the names of Alternatives 3 through 10.* *2. Overall Protection of Human Health and the Environment: For Alternatives 1 through 6, "No". For Alternatives 7 through 10: "Yes".* *3. Complies with ARARs: For Alternatives 1 through 6, "No" with a footnote stating "A TI Waiver would not be granted because PTW is readily accessible and removal or treatment is feasible with currently available engineering technology." For Alternatives 7 through 10, "Yes" with a footnote stating "It is assumed that a TI waiver would be granted if monitoring data indicate that MCLs may not be met, since all known PTWs would be addressed under this alternative."* *4. For balancing criteria, update with ratings from the text of Section 7.*	For 2&3 - See PRP Response No. 1 to EPA Comment Item 2.a above and PRP Response No. 34 to Page ES-12, *Overall Protection of Human Health and the Environment* Summary below. For 4 - There are inconsistencies in the text of Section 7 on ratings. Alternative 4 is rated low for long-term effectiveness in Section 7.5.3.3 and moderate in Section 7.5.1.3. Alternative 7 is rated low for short-term effectiveness in Section 7.5.1.3 and moderate in Section 7.5.5.5.	For 2 & 3, see EPA's response to PRP Response No. 1. For 4, the Respondents should correct ratings to reflect what they are in specific criteria sections, not where they are referenced (in error) in other sections. Ratings modifications are addressed in PRP Response No. 48.
28	EPA Comment Item 82	*Duplicate new Table 7-3 and revise as follows:* *1. For Alternatives 1 through 6, replace symbols for the balancing criteria with dashes.* *2. Add footnote to the Overall Protectiveness of Human Health and the Environment criterion for Alternatives 1 through 6 stating "Because this alternative does not satisfy the Threshold Criteria, it is not carried forward in the Balancing Criteria comparison."*	See PRP Response No. 34 to reference *Page ES-12, Overall Protection of Human Health and the Environment Summary* below.	EPA agrees to strike this comment.

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29	EPA Comment Item 123	*Costs for dredging BMPs could lead to a significant increase in per-cubic-yard cost for dredging. Respondents should describe how these are represented in the 25% contingency. (Comment from Draft FS, not addressed.)*	Need to clarify to which BMPs the EPA is referring. The sediment environmental controls and sheet pile enclosure costs are explicitly included in the cost estimate and are not built into the dredging unit cost or covered entirely in the contingency.	EPA agrees to strike this comment.
30	Page ES-2, *Site Description and Source Area*	*Waste from Quendall Pond has migrated into adjacent Lake Washington.*	See PRP Response No. 19 to EPA Comment Item 20.	EPA disagrees with the suggested edit (same as Comment 19).
31	Page ES-7, *Site Areas and Media Targeted for Remedial Action* Also Section 4.4.1.8	*DNAPL at the Site cannot be reliably contained because any vertical barrier/treatment wall that would be installed at the Site could only be a "hanging" wall. There is no aquitard in which to anchor a barrier/treatment wall.*	The EPA's characterization that there is "no aquitard" is misleading when used in this context. The shallow alluvium contains laterally extensive low permeability peat deposits that in the aggregate limit the downward migration of DNAPL at the Site. A complete physical barrier (sides and bottom) is not needed to reliably contain all Site DNAPL. DNAPL present as oil-coated soil is not mobile. There is a finite source, and even if DNAPL present as oil-wetted soil were disturbed by future earthquakes, etc., most could not move beyond the Site boundaries. DNAPL containment strategies implemented at other CERCLA sites include hanging walls (e.g., McCormick and Baxter, PSR).	In the December 3, 2014 meeting, EPA agreed to provide an additional response regarding this issue. EPA is refining its comment to include the constituents leached from DNAPL. Revised wording: *"DNAPL and groundwater-leachable constituents cannot be reliably contained because . . . "* The stratigraphy/geology of the shallow alluvium, in aggregate, limits downward and lateral migration of mobile DNAPL. However, leached constituents such as benzene and naphthalene from the DNAPL source have been observed at great depths in the coarse alluvium. Therefore, the lack of a substantial, continuous, horizontal aquitard separating the shallow alluvium from the coarse alluvium renders a downgradient hanging barrier/treatment wall less effective. In addition, McCormick & Baxter is not a relevant reference because it is mostly a fully-encapsulating wall keyed to a relatively thick silt formation, except for an area near one corner. It also includes a RCRA cap that prevents infiltration.
32	Page ES-12, *RAOs for Protection of Human Health*	*Alternatives 7 through 10 treat or remove all known PTWs and, therefore, may restore groundwater to meet drinking water standards for one or more COCs throughout most of the plume, if not all of the plume. For these alternatives, institutional controls that specifically address use of drinking water would not be fully required in perpetuity.*	We disagree with this point and the EPA does not provide a technical basis for these statements. Leaching from the solidified mass would likely require ICs for drinking water in perpetuity.	See EPA's response to PRP Response No. 1. Cited language can be changed to indicate that alternatives that treat or remove all known PTWs have significantly greater effect on plume reduction than those that leave known quantities of PTW behind. For these alternatives, institutional controls that specifically address use of drinking water may not be required across the entire site in perpetuity.
33	Page ES-12, *RAOs for Protection of Human Health*	*…whereas a soil cap may not be needed for Alternatives 7 through 10, where all PTWs are removed or treated.*	Alternatives 7 through 10 leave contaminated soil (not DNAPL) in place that exceeds PRGs, and a soil cap would still be needed.	Respondents may qualify that less soil cover may be required for these alternatives.
34	Page ES-12, *Overall Protection of Human Health and the Environment Summary* Also Sections 7.3.1.3, 7.4.1.3, 7.5.1.3, 7.6.1.3, 7.7.1.3, and 7.8.1.3.	*Alternatives 2 through 6 would not meet [the threshold criterion Overall Protection of Human Health and the Environment.]*	It is unclear whether the EPA is claiming that Alternatives 2 through 6 would not meet this criterion due solely to the ARAR compliance issue, or whether the long-term effectiveness and permanence of these alternatives is also judged to be inadequate. The NCP states (*40CFR 300.430(e)(9)(iii)(A)*): *Overall protection of human health and the environment. Alternatives shall be assessed to determine whether they can adequately protect human health and the environment, in both the short- and long-term, from unacceptable risks posed by hazardous substances,*	See EPA's response to PRP Response No. 1.

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			pollutants, or contaminants present at the site by eliminating, reducing, or controlling exposures to levels established during development of remediation goals consistent with § 300.430(e)(2)(I). Overall protection of human health and the environment draws on the assessments of other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs. The analysis must draw on the assessment of other criteria. The fundamental question is whether exposures are controlled in the short-and long-term. Since ICs can be used to control exposure to groundwater exceeding MCLs, protection is achieved. In addition, the EPA determines that leaving untreated DNAPL on site results in an unacceptable risk, but does not provide its rationale. Region 10's interpretation essentially precludes consideration of containment of DNAPL as a component of any remedial action at the Site. This is inconsistent with the EPA's policy on PTW and how it has been applied at other Superfund sites involving DNAPL.	
35	Page ES-13, *Overall Protection of Human Health and the Environment Summary*	*Alternatives 7 through 10 would meet [the threshold criterion Overall Protection of Human Health and the Environment] because all known PTWs are removed or treated. They would also likely comply with the MCL ARAR…*	The linkage between PTW removal/treatment and meeting overall protectiveness is not clear. The statement that Alternatives 7 through 10 would likely comply with the MCL ARAR is not supported. Also, in a footnote the EPA states that some DNAPL *could be inadvertently missed during remedial implementation.* Is the EPA confident that this residual DNAPL is unlikely to significantly impact groundwater quality?	See EPA's response to PRP Response No. 1. Language such as "would likely comply with the MCL ARAR" can be changed to indicate that alternatives that treat or remove all known PTWs are presumed to have significantly greater effect on plume reduction than those that leave known quantities of PTW behind (e.g., Alternative 6 leaves 40,000 gallons). Regarding "Is EPA confident that this residual DNAPL (inadvertently missed) is unlikely to significantly impact groundwater quality?" – EPA's focus is on doing as much work as is practicable to address known PTW and reduce the source of groundwater contamination, expecting not all the PTW may be found (common in any cleanup scenario). Groundwater impacts from residual DNAPL are expected to be significantly less than those leaving 40,000 gallons or more of known PTW behind (Alternatives 1 through 6).
36	Page ES-13, *Compliance with the MCL ARAR*	*Benzene was predicted to exceed its MCL after 100 years for Alternatives 1 through 7 and 9. It was predicted to achieve its MCL after 28 years for Alternative 8, and after 14 years for Alternative 10. EPA believes that the timeframes for Alternatives 8 and 10 may also be relevant for Alternatives 7 and 9, given that the extent of benzene MCL exceedances based on empirical data are smaller than the model predicts, in situ solidification is likely to oxygenate the subsurface and aid in volatile attenuation, and the resulting solidified materials are not considered to be aquifer materials.*	The third point (solidified materials are not aquifer materials) is already accounted for in the groundwater model. The assumption that oxygen added during solidification will greatly reduce restoration time frame is not supported by any data; rather, similar remediation techniques (oxygen-release compounds) are not effective given the mass of contaminants found in DNAPL. Finally, the groundwater model over-prediction of the benzene plume extent has nothing to do with estimated restoration time frame under solidification scenarios. The solidified mass acts as an on-going source in perpetuity. It is unclear how the EPA can, on this basis, conclude that these very different alternatives may have similar restoration time frames.	In the December 3, 2014 meeting, EPA noted that the Respondents may remove sentences saying that restoration timeframes for Alternatives 8 and 10 may be relevant for Alternatives 7 and 9. The Respondents may also remove the statement inferring that ISS may oxygenate and aid in volatile attenuation.

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37	Page ES-13, *Compliance with the MCL ARAR*	*The reason the groundwater model predicts MCL exceedances after 100 years for Alternatives 7, 8, and 9 is that it assumes a baseline condition in where benzo(a)pyrene exceeds the MCL outside of the DNAPL areas; therefore, even when the DNAPL source is removed, the model assumes that the MCL exceedances remain and do not degrade over time.*	This is incorrect – the groundwater model <u>does</u> assume that residual BaP degrades over time; it just takes >100 years to achieve the MCL.	In the December 3, 2014 meeting, EPA noted that the Respondents may change "do not degrade over time" to "do not significantly degrade over time".
38	Page ES-14, *Compliance with the MCL ARAR*	*For Alternatives 7 through 10, EPA believes that if the known DNAPL source is removed or treated, arsenic will also be more significantly reduced than the modeling predicts.*	We disagree with this point and the EPA does not provide any authority for this statement.	Respondents may change "arsenic will also be more significantly reduced" to "arsenic may also be more significantly reduced".
39	*Section 4.4* • *DNAPL Cumulative Thickness.*	*Greater cumulative thicknesses of DNAPL (either oil-coated or oil-wetted) can contribute more significantly to groundwater contamination. Further, DNAPL residuals present as thin stringers have more surface area per volume of DNAPL; therefore, cumulative thicknesses that comprise multiple layers may impact groundwater as much or more significantly than contiguous DNAPL occurrences.*	We disagree with and this point and the EPA does not provide any authority for this statement. Contribution to groundwater depends also on geology, groundwater occurrence, and DNAPL leaching characteristics/weathering. The Site area with the greatest cumulative thicknesses (North Sump) has relatively modest contaminant concentrations in groundwater.	EPA agrees that multiple factors affect contribution to groundwater, but this section is focused on DNAPL cumulative thickness and the text is intended to provide support for why it is used as differentiator for the array of alternatives. Regardless of the effect on groundwater, PTW is defined as visibly oil-coated or oil-wetted soil or sediment, Cohen and Mercer (1993, cited in the RI Report) provides support for the concept of NAPL fingers and ganglia having more contact area with groundwater than an equivalent pool of NAPL. They note that these ganglia may produce higher chemical concentrations in groundwater, while depleting the NAPL source more quickly than a NAPL pool of equivalent mass. Conversely, DNAPL pools (greater thicknesses of oil-wetted materials) may provide a source of groundwater contamination long after residual fingers and ganglia have been depleted. The Respondents may revise the first sentence to: "may contribute". The second sentence may be revised to reflect the discussion above. The Respondents may also add a sentence noting that contribution to groundwater also depends on geology, groundwater occurrence, and DNAPL leaching characteristics/weathering.
40	*Section 4.4.1.1 Railroad DNAPL Area (RR DNAPL Area)*	*Boring BH-30C is also the only location at the Site where DNAPL has been observed in the transition zone between the Shallow Alluvium and Deep Alluvium.*	What is the "transition zone"? The RI does not refer to a transition zone and there does not appear to be any basis for labeling the area between the Shallow and Deep Alluvium as a transition zone.	EPA agrees to strike this revision.
41	*Section 4.4.1.8 Key Factors Influencing DNAPL Remediation*	*EPA has determined that DNAPL at the Quendall Site, whether in soils or sediments, is to be considered as PTW because of the high level of toxicity inherent in the creosote/coal tar DNAPL. Creosote/coal tar contaminants present in DNAPL (benzene and naphthalene) are also highly leachable and mobile via groundwater, and DNAPL classified as oil-wetted may also be mobile.* *DNAPL at the Site cannot be reliably contained because any vertical barrier/treatment wall that would be installed at the Site could only be a 'hanging" wall. There is no aquitard in which to anchor a barrier/treatment wall.*	Some Site DNAPL has lower mobility, lower leachability, and/or lower toxicity and should not be classified as principal threat waste. Lower mobility DNAPL at other CERCLA sites (e.g., Utah Power and Light) has been characterized as low-level threat waste. We believe this same designation is appropriate for portions of the DNAPL source at the Site. The EPA has provided no basis for designating all of the DNAPL as PTW. See PRP Response No. 31 to Page ES-7, Site Areas and Media Targeted for Remedial Action above. Sediment DNAPL is located in layers as deep as 16 feet below mudline, which provides severe technical challenges for removal.	EPA stands on its definition of visibly oil-wetted or oil-coated soil or sediment as PTW, which is to be addressed consistently. Differing locations (e.g., depth) and mobility may influence prioritizing interim actions but a final remedy must address all PTW unless technically impracticable. As noted earlier, EPA is refining its comment to include the constituents leached from DNAPL. Suggested wording: "DNAPL <u>and groundwater-leachable constituents</u> cannot be reliably contained because . . . " Regarding accessibility, the text may be revised to indicate that the majority of site DNAPL is accessible, with

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		DNAPL is accessible. The majority of DNAPL in the uplands is found within the top 20 feet of the Shallow Aquifer with two exceptions (RR Area and Former May Creek Channel).		exceptions being in the RR Area and Former May Creek Channel in the uplands and in some nearshore areas.
42	*Section 6.3.4.5 (for example)*	*An engineered sand cap would be placed over sediments where porewater data exceeds cleanup numbers…*	What are 'cleanup numbers'?	Cleanup numbers are equivalent to PRGs. The Respondents may revise this text accordingly. In the December 3, 2014 meeting, EPA and Respondents also agreed to confirm understanding of the purpose of the sand cap. In a December 5, 2014 email from Respondents' Consultant to EPA, the following was provided: "To clarify, the proposed Engineered Sand Cap composed of 1.5 feet of sand in the nearshore Non-DNAPL areas would sufficiently reduce contaminant flux such that surface sediment porewater/surface water PRGs would be attained." Please ensure that this is clear in the final FS.
43	*Section 7.1.1.1 Overall Protection of Human Health and the Environment*	*In the detailed evaluation of each alternative, the Overall Protectiveness criterion will be rated as "No", or "Yes", based on consideration of whether: 1) all exposure pathways are mitigated; 2) the alternative has long-term effectiveness and permanence; 3) does not pose a high short-term risk; and 4) meets ARARs or is waived from the requirement for compliance with an ARAR.*	See PR Response No .34, to Page ES-12, *Overall Protection of Human Health and the Environment* Summary above.	See EPA's response to PRP Response No. 1.

44 a	*Section 7.1.1.2 Compliance with ARARs*	• *Because the baseline-generated plumes are larger than empirically determined plumes, the predicted model outcomes (restoration time frames and resultant plume sizes) are also likely to be "larger" than actual outcomes. This infers the following:*
		  • *Model-estimated restoration time frames are longer than the actual time frames would be.*
		  • *Model-estimated plume volumes (based on incremental removal of source) are larger than the actual plume volumes would be.*
		  • *This is especially important for Alternatives where all source materials are treated or removed (Alternatives 7 through 10).*
		  ◆ *For benzene and naphthalene, the remaining contaminant mass will flushed and the mass and thus groundwater concentrations of these COCs would decay over time based on their half-lives.*
		  ◆ *For benzo(a)pyrene, empirical data indicate a close association of MCL exceedances with the occurrence of DNAPL. The model baseline condition plume for benzo(a)pyrene includes areas outside of the DNAPL footprint with MCL exceedances, while empirical data show no exceedances.*[1] *Therefore, the model results*
			The EPA's inference is flawed. The groundwater model assumptions that lead to over-predictions of plume size do not necessarily over-predict restoration time frame. Leaching from the solidified block would create a 'halo' (acknowledged by the EPA in the subsequent paragraph) that would remain in perpetuity and not be 'flushed out' as indicated by the EPA. Also, as the EPA acknowledges, benzo[a]pyrene is present in groundwater above MCLs outside the area of DNAPL. Benzo[a]pyrene is also present in soil outside the area of DNAPL at concentrations that leach to groundwater resulting in concentrations above MCLs. Because of the recalcitrant nature of benzo[a]pyrene, concentrations above MCLs would persist very long after source treatment. See also PRP Response No. 37 to Page ES-13, *Compliance with the MCL ARAR* above.	In the December 3, 2014 meeting, EPA committed to review this comment again.
				Upon further review, the Respondents may delete the cited text.

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		show that, if the DNAPL source is removed, then there are still areas of the Site with MCL exceedances that would not significantly degrade overtime. Based on empirical data, if the DNAPL source is removed, then the benzo(a)pyrene plume should also be fully addressed. ◆ *For arsenic, treatment or removal of the DNAPL source is anticipated to affect a change in the subsurface reducing conditions that have enhanced arsenic mobility.* [1] *Note that there are a few instances of very low detections of benzo[a]pyrene above the MCL in areas outside the current DNAPL "footprint." In most cases, they are immediately outside the footprint or only marginally above the MCL (0.24 micrograms per liter in BH-29A, compared with the MCL of 0.2 micrograms per liter).*		
44 b	*Section 7.1.1.2* • *Residuals from in situ solidification.*	*It is expected that there will be a "halo" around the solidified area(s). The mobile benzene and naphthalene that leaches from the block(s) will be undergo degradation and will be dispersed and diluted in the groundwater. Because benzo(a)pyrene is essentially immobile, it will not likely leach from the block(s) or leach only a de minimis amount. EPA does not considered the solidified block as aquifer material; however the model assumes no change in groundwater concentrations in the block as a result of the solidification. This assumption most likely yields greatly over-stated initial post-remediation COC concentrations within the solidified areas and therefore greatly over-stated mass flux estimates that contribute to downgradient MCL exceedances and longer restoration timeframes.*	While the solidified block may not be considered by the EPA as "aquifer material", it nonetheless is saturated with contaminated porewater in contact with DNAPL. The groundwater model correctly reflects this condition. The EPA does not provide any explanation as to why or authority to support its statement that groundwater in intimate contact with DNAPL within the solidified block would have lower COC concentrations than present groundwater conditions.	In the December 3, 2014 meeting, EPA committed to review this comment again. The Respondents may remove the portion of the text that states: *"EPA does not considered the solidified block as aquifer material; however the model assumes no change in groundwater concentrations in the block as a result of the solidification. This assumption most likely yields greatly over-stated initial post-remediation COC concentrations within the solidified areas and therefore greatly over-stated mass flux estimates that contribute to downgradient MCL exceedances and longer restoration timeframes."*
45	*Section 7.1.1.2* • *Residuals from potentially not addressing every occurrence of DNAPL.*	• *Although the lateral and vertical extent of PTW remediation in both the upland and aquatic areas of the Site will be based on a field performance standard (to be determined during remedial design), small volumes and masses of DNAPL residuals could be inadvertently missed during remedy implementation. DNAPL residuals would most likely be in very thin laterally discontinuous sand stringers within the Shallow Aquifer bounded by relatively impermeable silts/clay making them very low strength groundwater contamination sources. Naphthalene and benzene mass and thus groundwater concentrations would decay over time based on their half-lives. Benzo(a)pyrene would essentially not decay and would remain essentially immobile and not significantly contribute to dissolved groundwater contamination.* *It is expected that best management practices would be used during remedy construction to address these issues related to residuals.*	Given the complex distribution of DNAPL at the Site, we agree that it is highly likely that DNAPL residuals will result under any alternative. While we believe that portions of the DNAPL source can be reliably contained, even small amounts of DNAPL remaining will persist and contribute to localized groundwater contamination in perpetuity. EPA states that it expects that BMPs will address these occurrences but provides no information on the BMPs to be used or to what degree they would address residuals. Regardless of the BMPs used during the remedy, residuals will remain and will be a source to contamination to groundwater in perpetuity.	In the December 3, 2014 meeting, EPA committed to review this comment again. Upon further review, the Respondents may remove the portion of the bullet that says: *"Naphthalene and benzene mass and thus groundwater concentrations would decay over time based on their half-lives. Benzo(a)pyrene would essentially not decay and would remain essentially immobile and not significantly contribute to dissolved groundwater contamination."* The last sentence about BMPs (after the bullet) may also be revised to: *"It is expected that issues related to residuals will be addressed during remedial design, treatability testing, and remedial construction, in order to adequately characterize the nature and extent of DNAPL and maximize the effectiveness of removal and/or treatment technologies ."*
46	*Section 7.3.3.2 Adequacy and Reliability of Controls*	***RCM Caps.*** *The adequacy and reliability of RCM caps is difficult to predict because the technology is relatively new. There is little field information about long-term effectiveness and reliability of RCM caps. There is no field information about how RCM*	See PRP Response Nos. 7 and 16 to EPA Comment Items 3.a.iii and 12.	See EPA's response to PRP Response Nos. 7 and 16. Respondents may revise discussion of RCM caps in Section 7.3.3.2 in the context that RCM caps could still be used for alternatives that proposed them for T-Dock

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		placement and replacement/repair may affect the long-term viability of the RCM caps. The lack of long-term field experience and the need for treatability/pilot studies is a significant concern about the reliability of a technology that will be required in perpetuity. There is considerable debris on and in the surface sediments at Quendall that may cause problems with RCM integrity unless the sediment is sufficiently cleared of debris. The shoreline bathymetry would be required to be maintained, which may limit repair and replacement options. RCM caps may lose their effectiveness when the reactive material becomes saturated or damaged.		sediment. As noted earlier, amended sand caps will be included for alternatives that proposed RCMs in the nearshore area. EPA will review revisions prior to finalizing the FS.
47	*Section 7.3.6.1 Technical Feasibility*	*There is little field experience with the general use of RCM caps and especially, there is no field information/experience regarding the long-term use and long-term efficacy of RCM caps. There is no information about the expected longevity of RCM caps nor is there much experience with repairing/replacing RCMs when they become ineffective. Unusual technical challenges are expected when RCM caps are placed and repaired or replaced in the aquatic environment because they have only been in use for a short period of time*	See PRP Response Nos. 7 and 16 to EPA Comment Items 3.a.iii and 12.	See EPA's response to PRP Response Nos. 7 and 16. Respondents may revise discussion of RCM caps in Section 7.3.6.1 in the context that RCM caps could still be used for alternatives that proposed them for T-Dock sediment. EPA will review revisions prior to finalizing the FS.
48	*Section 7, General*	Balancing Criteria Ratings	We disagree with the rating of alternatives that the EPA has assigned for the following NCP criteria: 'Low' for Long-Term Effectiveness of Alternatives 4 and 4a. 'Low' for Implementability of Alternative 3. 'Moderate' for Short-term effectiveness and Implementability of Alternative 4a. 'Moderate' for short-term effectiveness of Alternative 7. 'High' for implementability of Alternative 7.	EPA has reviewed the Respondents' rationale for proposed ranking changes and agrees to the following: 'Low' for Long-Term Effectiveness of Alternatives 4 and 4a. *EPA accepts the proposed change from 'low' to 'moderate' for these alternatives, given the change from RCM caps to amended sand caps in the nearshore.* 'Low' for Implementability of Alternative 3. *EPA will accept a change from 'low' to 'moderate' (not 'low' to 'high' as proposed) based on the rationale given, particularly with the change from RCM caps to amended sand caps in the nearshore.* 'Moderate' for Short-term effectiveness and Implementability of Alternative 4a. *EPA accepts the proposed change from 'moderate' to 'high' for rating.* 'Moderate' for short-term effectiveness of Alternative 7. *EPA rejects the proposed change from 'moderate' to 'low' for this rating. While the in-water construction activities for Alternative 7 are more extensive than Alternative 6, the upland activities are similar. Alternatives 8 through 10 include similar to more extensive in-water work, as well as more extensive upland construction, and should be distinguished as rating lower than Alternative 7.* 'High' for implementability of Alternative 7.

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				EPA accepts the proposed change from 'high' to 'moderate' for this rating.